

ABSTRACT

A three-dimensional thermoacoustic imaging system uses dye markers. Thermoacoustic signals are produced by the dye markers when light from an external source is absorbed by the dye. Thermoacoustic images with and without dye stimulation may be generated using excitation frequencies both inside and outside the frequency band of fluorescence of the dye marker, and these may be combined, and/or combined with conventional ultrasound images for image enhancement. An apparatus for carrying out this method on mice, uses a commercially available array of transducers positioned opposite to the body of the mouse, which is immersed in a coupling media. A source of illumination such as a laser directs light to the mouse through the coupling media, and resulting acoustic waves are captured by the array and reconstructed to form an image.